

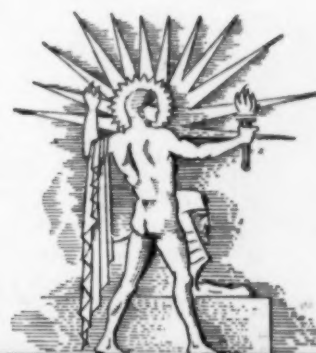
PRICE
15¢

PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

OCT 31 1933

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



OCTOBER 28, 1933

Witch-Weather on a Mountain-Top

See Page 282

A

SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL XXIV

No. 655

The Weekly  Current
Summary of Science

Published by

SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

Subscription rates—\$5.00 a year postpaid; two years \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one in notification to Circulation Department, SCIENCE NEWS LETTER, 21st and Constitution Ave., Washington, D. C., at least two weeks before change is to become effective.

Advertising rates furnished on application.

Board of Trustees of Science Service

Honorary President, William E. Ritter, University of California. Representing the American Association for the Advancement of Science, J. McKeen Cattell, President, Editor, Science, Garrison, N. Y.; Burton E. Livingston, Johns Hopkins University, Baltimore, Md.; Raymond Pearl, Director, Institute for Biological Research, Johns Hopkins University, Baltimore, Md. Representing the National Academy of Sciences, W. H. Howell, Vice-President and Chairman of Executive Committee, Johns Hopkins University, Baltimore, Md.; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; David White, Senior Geologist, U. S. Geological Survey. Representing National Research Council, Vernon Kellogg, Secretary Emeritus, National Research Council, Washington, D. C.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry. Representing Journalistic Profession, John H. Finley, Associate Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Marlen E. Pew, Editor of Editor and Publisher, New York City. Representing E. W. Scripps Estate, Harry L. Smithson, Treasurer, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Thomas L. Sidlo, Cleveland, Ohio.

Staff of Science Service

Director, Watson Davis; Staff writers: Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, J. W. Young; Librarian, Minna Gill; Sales and Advertising Manager, Hallie Jenkins.

Copyright, 1933, by Science Service, Inc. Reproduction of any portion of the SCIENCE NEWS LETTER is strictly prohibited since it is distributed for personal, school, club or library use only. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service, details and samples of which will gladly be sent on request.

Members of the American Association for the Advancement of Science have the privilege of subscribing to the SCIENCE NEWS LETTER at the reduced price of \$3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A. A. A. S., Smithsonian Institution Building, Washington, D. C.

Publication Office, 1930 Clifton Ave., Baltimore, Md., Editorial and Executive Office, Constitution Ave. at 21st St., N. W., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Scienserv. Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. and Canadian Patent Offices.

DO YOU KNOW?

The oldest North American mountains are the Ozarks.

Many species of water birds use their wings for swimming only.

Florida harvested over 87 million narcissus bulbs during the season just closed.

Production of pears in the United States has more than doubled in the past twenty years.

In the past 15 years there is no record of the birth of elephants in America, says the director of the Milwaukee Zoo.

The London Zoo is now keeping open house two evenings a week, so that visitors may see the animals that are more lively at night.

For the benefit of superstitious automobile drivers: an Oregon official says that fewer accidents occur on Friday than any other day, excepting Wednesday.

The Harvard Medical School celebrated its 150th anniversary this year.

In contrast to most commercial markets, Palestine increased its imports in 1932.

It is estimated that there are in the United States, at any given time, 300,000 cases of cancer.

A bird sanctuary for flamingoes in northern Cuba was established by presidential decree last June.

An expedition to Greenland has found the greatest known fjord, almost 200 miles long and 4,500 feet deep.

The Australian boomerang that sails out and returns is a plaything, while the boomerang made in Australia for hunting and fighting does not return.

Correction—Third paragraph of "Do You Know?" in SNL, Oct. 14, 1933, p. 242, should read: There are about five to six million red blood cells per cubic millimeter of blood in the body of a grown man.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY

Remains of what people are sought in Tennessee Valley? p. 283.
Where did man eat man in America? p. 286.
Who ever saw a purple cow? p. 283.

ASTRONOMY

When is the sunspot minimum expected? p. 276.

CHEMISTRY

What new institution is devoted to salvaging semi-wastes? p. 280.

ENDOCRINOLOGY

What is baby rabbit wrapped in? p. 284.

ENGINEERING

What replaces the track for the new Soviet Union train? p. 281.

Where can you visit a working coal mine without getting dirty? p. 278. *The Story of Coal—Museum of Science and Industry, 1933, 15c.*

Why is oil processing to be done underground? p. 281.

EVOLUTION

Why cannot large creatures weather adversity? p. 286. *The World of Fossils—Carroll Lane Fenton—Appleton-Century, 1933, \$2.*

GENETICS

What is a gene? p. 275.

GEOLOGY

How deep has man dug beneath the earth's surface? p. 285. *Igneous Rocks and the Depths of the Earth—Reginald A. Daly—McGraw-Hill, 1933, \$3.*

MEDICINE

Can cancer be cured? p. 280.
In what vegetable does danger of cyanide poisoning lie? p. 275.

What is the newest substitute for the oxygen tent? p. 282.

What new treatment may save the lives of both mother and child in childbirth? p. 281.

MINING ENGINEERING

How are islands made by salt? p. 277.

PALEONTOLOGY

How long ago did feet walk the earth in what is now Ohio? p. 280.

PUBLIC HEALTH

What diseases afflict unemployed victims of the depression? p. 282.

PUBLIC SAFETY

What is the cure for "driving while asleep?" p. 281.

SOCIOLOGY

Why is a biologist studying economic "castes"? p. 276.

VETERINARY MEDICINE

Why is it impossible to inject rabies vaccine into the brain? p. 281.

ZOOLOGY

Why is the artificial feeding of Yellowstone elk being reduced? p. 277. *Animal Life of Yellowstone National Park—Vernon Bailey—Thomas, 1930, \$4.*

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in the United States.

GENETICS

Nobel Prize Rewards Study Of "Atom" of Heredity

Former President of National Academy and A. A. A. S.
Developed Theory of Gene By Mathematics and Experiment

DR. THOMAS HUNT MORGAN, of California Institute of Technology, has been honored with the Nobel Prize in medicine for his epochmaking discovery of the mechanism of heredity and his formulation of the theory of the gene. Dr. Morgan is the eighth American to be given a Nobel Prize for achievements in science. Three of these eight awards were for contributions to medicine.

The gene is to the student of heredity what the atom is to the physicist. No one has ever seen a gene just as no one has ever looked upon an atom, although attempts have been made to demonstrate to human senses these tiny carriers of heredity by microscopic and photographic means.

Dr. Morgan developed his theory in the same way that Einstein evolved the famous physical theory of relativity—through mathematics and the use of numerical data. But he obtained his numerical data from an enormous number of experiments.

The minute single sperm and egg cells, from the mating of which the new individual results, have within them smaller units known as chromosomes. The number of chromosomes is greater in some kinds of plants and animals than in others; for man it is 48. The chromosomes are so tiny that all the chromosomes in the original cells of all the inhabitants of the earth could be contained in a teacup.

This chromosome, or biological "molecule," is now believed to be made up of a row of genes which are conceived of as being like beads on a string, held together by some chemical attraction, perhaps—normally in the same order for the same species of creature. The genes control the development of the individual, and they are distinguished by their effect on certain characteristics such as eye color, hair texture, skin color, and so on.

Dr. Morgan based his theory on the observed fact that certain genes, when inherited together from one parent, are

associated also in the offspring. The frequency of these associations varies. Some groups come out together much oftener than others. These variations in "linkage frequencies" were accounted for by Dr. Morgan by a change of partners between parts of the paired chromosomes, the more distant pairs changing more often, and the closer ones clinging longer.

These variations enabled Dr. Morgan actually to make maps showing the order or location of genes in the chromosomes.

Dr. Morgan's historic experiments were performed with the ordinary tiny fruit fly, familiar to housewives and fruit dealers through its fondness for hovering about bananas. It is particularly useful to the geneticist because it produces new generations so quickly.

The Nobel Prize is the climax of a series of notable awards and recognitions that have come to Dr. Morgan during a long active life. His fellow-scientists in America gave him their greatest honor in 1927 by electing him to the presidency of the National Academy of Sciences. He was also made president of the American Association for the Advancement of Science in 1930.

Science News Letter, October 28, 1933

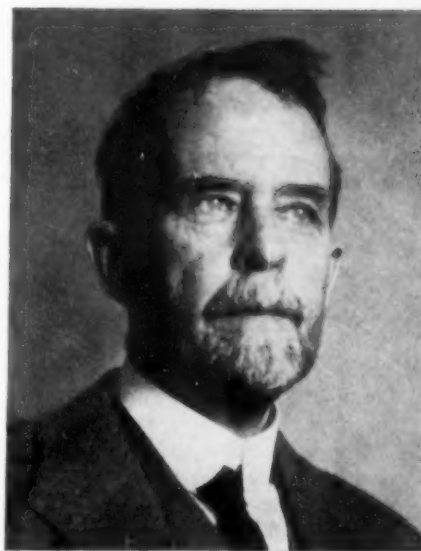
MEDICINE

New Cyanide Antidote Promises Great Usefulness

HOPE FOR SAVING the life of a person who has taken as much as 32 grains of poisonous potassium cyanide or a pound of bitter almonds is seen in a new remedy made up of the two chemicals, amyl or sodium nitrite and sodium thiosulphate.

Experiments with the new remedy were reported by Dr. K. K. Chen, Charles L. Rose and Dr. G. H. A. Clowes of the Lilly Research Laboratories to the American Public Health Association.

"Cyanide poisoning may arise from



DR. THOMAS HUNT MORGAN

Whose researches on heredity, including the development of the theory of the gene, were rewarded by his selection for this year's Nobel Prize in Medicine.

suicides, homicides, ship fumigation, photography, electroplating, gilding, and accidents caused by taking cyanide preparations, bitter almonds, arrow grass, or certain mushrooms," members of the association were reminded. "Since 1909 there have been from 79 to 243 deaths annually in the registration area of the continental United States. On the average, the mortality rate is 0.1 per 100,000 population.

"Although different antidotes have been proposed against cyanide, the treatment of its poisoning still remains unsatisfactorily solved. The reason for this is twofold. First, cyanide poisoning is rapidly fatal. Secondly, the therapeutic measures are usually limited in their usefulness."

The Indianapolis investigators found recently that amyl nitrite is twice as efficient an antidote for cyanide poisoning as methylene blue, the dye which has lately been heralded as saving lives of cyanide victims. The nitrite-thiosulphate combination is even better, being at least five or six times as effective as methylene blue. Dr. Chen and colleagues reported. Their results were obtained with dogs, and they point out that the ultimate proof of the value of the remedy will come from clinical trials on victims of cyanide poisoning.

Their results were said to be, in general, in agreement with those reported by E. Hug, and A. Buzzo and R. E. Caratalá of Argentina.

Science News Letter, October 28, 1933

ASTRONOMY

New Cycle of Sunspots May Begin in Next Few Months

Solar Disc is Least Spotted Since 1923, Last Minimum Period of Famous Ten-and-a-Quarter Year Cycle

THE SPOTTEDNESS of the sun is at a low ebb. The old cycle of sunspots has nearly run its course. Any day now Mt. Wilson Observatory astronomers would not be greatly surprised to see on the sun's face the first of a new family of spots, the leader in a new cycle of spots to last nearly eleven years.

The sun continued to be nearly inactive in July and August, with only five spots all belonging to the waning cycle. In August the number of groups was lowest since 1923, when the last minimum in sunspots occurred. In September there was a slight increase in the number of spots but this was due, Dr. Seth B. Nicholson, Mt. Wilson astronomer, suggests, to a secondary and short-period fluctuation in the sun's spottedness, not to the beginning of another of the long cycles such as have been traced for centuries past in astronomical records and in natural phenomena such as tree rings.

Few Spots This Year

Dr. Nicholson explained that the low level of solar activity may continue for several months and may even extend into 1934. The time between sunspot minima has been about $10\frac{1}{4}$ years and if the waning cycle is of that length, the exact time of minimum should be this month or next. The astronomers can not generally tell just when is the real turning point until some months after it occurs.

Sunspots are gigantic disturbances in the luminous layer or photosphere of the sun. The dark central part or umbra of spots varies in diameter from 500 miles to some 50,000 miles. The earth could be lost in the swirl of the larger spots. Sometimes the larger sunspots can be seen with the unaided eyes when the sun is dimmed in setting or when a shade glass is used in viewing it.

The German astronomer, Schwabe, in 1843 first discovered that the number of spots varies greatly in different years and shows an approximately regular periodicity of about eleven years.

Dr. George E. Hale, now director emeritus of Mt. Wilson Observatory, discovered that when the sunspots appear in pairs the leading spot is opposite in magnetic polarity to the following spot. The spots in the northern hemisphere of the sun are also opposite in sign to the analogous spots in the southern hemisphere. He also found that the sun is a giant magnet much like the earth in this respect.

SOCIOLOGY

Biologist Finds Multiplicity Of "Castes" Even in America

HUMAN SOCIETY has evolved many more different castes than have ant and termite societies. To Americans steeped in the idea that "all men are created free and equal," this may seem to be a statement more applicable to India or some other foreign land than to the U. S. A.

Nevertheless such is the finding of Prof. Raymond Pearl of the Johns Hopkins University, a leading biologist, who has prepared a new classification and code of occupations for use in analyses of social and economic conditions.

Forces Affecting Population

In research in human biology, Prof. Pearl and his associates study such important factors as the death rate, the birth rate, and differential fertility. The new occupational classification which he discusses in *Human Biology* will permit a more thorough and penetrating analysis of the effect of social and economic forces as they influence our population. It is the first step in a systematic plan of research on population "castes" that is being undertaken in the Department of Biology of the Johns Hopkins School of Hygiene and Public Health at Baltimore.

At the beginning of a new sunspot cycle, the spots appear in high latitudes and the magnetic polarity characteristic of each hemisphere is reversed, and in this way astronomers now know that a new cycle is about to begin. Dr. Nicholson explains that the appearance of a new cycle spot will not mean that the exact time of sunspot minimum has arrived as the first spots of a new cycle often appear a month or two before the minimum.

Nearly every sort of earthly phenomena, from war, birthrates, and crop failures to magnetic storms and auroras, have been linked to sunspots by scientific enthusiasts. There is good observational evidence that sunspots and changes in the magnetism of the earth are related. The sunspot minimum now about due will have no real major effect on earthly conditions, astronomers contend.

Science News Letter, October 28, 1933

This new classification puts all occupations into three broad classes as follows: I. Owners, managers, officials and professional men; II. Skilled and semi-professional workers; III. Laborers—unskilled and semi-skilled. The primary purpose is to contrast, for research purposes, two classes of persons, namely those in class I and those in class III. Class I persons are, on the whole, situated at or near the top of things in the existing social organization. Those in class III are at or near the bottom in the same social organization. This leaves the second class who are neither very near the top nor the bottom, who if they sometimes think themselves worse off than those in class I are plainly and admittedly better off than those in class III.

A tabulation of the male population of New York State on this new classification shows that approximately 21 per cent. of the gainfully employed males in New York fall in class I, and 29 per cent. in class III, leaving 50 per cent. in the intermediate class II.

In commenting on this new classification to a representative of Science Service, Prof. Pearl said: "While we hear a good deal of rather vague talk

and writing about social organization, there is need for more precise statistical description and analysis of the actually existing organization of society. Human society has actually evolved a great many more of what amount to differentiated castes than have ant or termite societies. But we know practically nothing about what proportion of our human workers castes are either optimal or necessary."

Science News Letter, October 28, 1933

ZOOLOGY

National Park Animals In Condition For Winter

AS THE TOURIST season ends in the national parks of the West, a general check-up shows that the wild animals given protection therein generally are facing the winter in good condition, after a favorable summer. One or two situations, however, are causing concern.

The superintendent of Yellowstone National Park has informed the national parks office in Washington that the forage available for the northern herd of Yellowstone elk is not adequate and that a serious situation may arise should the coming winter be a severe one. Contributing causes are a series of dry years that have resulted in a poor forage crop, and over-grazing caused by heavy concentration of elk just inside the northern park line at Gardiner, Mont., and in the Lamar River district of the park at the junction of the Lamar and Yellowstone rivers. As a matter of fact, both the northern and southern elk herds have increased to the point where there is a serious problem of furnishing sufficient winter feed.

Commenting on this situation, Dr. Harold C. Bryant, whose supervision of research and educational activities in the national parks includes wild-life problems, states that national park authorities are determined upon a policy of reducing the amount of artificial feeding, with particular reference to cottonseed cake. It is their purpose to get the elk, particularly the northern herd, back on a self-reliant basis so as to present typical wild elk herds to visitors and not animals semi-domesticated through feeding. This they hope to achieve through the acquisition of additional natural feeding grounds and the control in numbers that will result from normal winter kill when artificial feeding is stopped.

Science News Letter, October 28, 1933

MINING ENGINEERING

Mining Sulfur Under Water Hailed as Chemical Advance

THE SUCCESSFUL mining of sulfur under water has just been reported as one of the outstanding chemical achievements of the year. This comes as welcome news in the face of information that many ideal deposits of sulfur are on the way to exhaustion. Credit for the practical application of the so-called Frasch process invented a number of years ago to vast deposits of sulfur under lakes and swamps in Louisiana goes to Lawrence O'Donnell, chemical engineer, and his associates.

Unexpected Yields

Bravely begun during the depression, the project had to overcome economic as well as chemical engineering problems. The yields of sulfur have far exceeded the expectations of the engineers in charge of development and operation. Whereas a plant was built with the expectation of turning out perhaps 300 long tons per day it has reached a production of 1,400 tons and regularly produces 1,200.

The mining is carried out by sinking a shaft 700 feet below the bottom of a lake where a stratum of sulfur 200 feet thick lies. Pipes leading to the plant on the shore are sunk and the sulfur, liquified by superheated water, is forced out by means of compressed air. To date 200,000 tons of sulfur of 99.92 per cent purity have been taken from the wells.

Lake Peigneur, where the mining is being carried out, contains half a dozen small islands formed by the pressure of plugs of salt originating five miles down in the earth. The great pressure there causes the salt to become plastic and it forces its way through faults and fissures to a point below where the sulfur is found. Hence salt is likewise very profitably mined in this locality. In fact it is these "salt domes" that force the sulfur nearer the surface of the earth. Oil is also found in the capping rock and on the sides of the domes. The Gulf states are of course noted for their oil deposits.

Science News Letter, October 28, 1933



"DREADNAUGHT" DINOSAUR BROUGHT HOME CANNED

Broken into 20,000 pieces, so that it had to be packed in containers ranging in size from soup cans to five-gallon buckets, the skeleton of a "Dreadnaught" dinosaur, more elegantly known as *Paleoscincus*, is now at the American Museum of Natural History, being assembled like an immense jigsaw puzzle by Barnum Brown and his associates. *Paleoscincus*, as this restoration sketch shows, was built on the general basic specifications of a modern horned toad, but with vastly larger dimensions: length, 18 feet; breadth, 6 feet; height, 5 feet.

ENGINEERING—GEOLOGY

Coal Mine in a Museum

In the Heart of Chicago You Can Now Visit a Full-Sized Coal Mine With All Machinery and 20 Men to Run It

By DR. FRANK THONE

GOING to see a museum used to mean walking endless foot-hurting leagues between depressing rows of glass cases, looking with varying degrees of interest—or boredom—at the stiffly stuffed animals or exceedingly dead-looking fossils or mineral specimens within them. Small wonder that museum-visiting came to have a dry and dusty connotation, and that only the more determined pursuers of culture were regular devotees of this unexciting indoor sport.

But all that is changed now. A museum of that sort would be a curiosity to the museum curators themselves now, and if they could find a place like that they would exclaim over it with as many grins and chuckles as we all do over some semi-antique which we can just barely remember in its heyday, such as an opal-glass figure of a pug dog like the one Aunt Minnie used to keep on the what-not. The old time dusty museum is as dead as any of the stuffed specimens it contained.



THOROUGHLY MODERN

The very latest mining machinery is operated for those who inspect the coal mine in Chicago's new Museum of Science and Industry.

The new idea in museum management is to keep its stuff as much alive as possible. If they have stuffed animals, they are mounted in life-like postures against a natural-habitat background, and they look out at you as though your coming had startled them into momentary still, alert attention. Similarly, if the museum undertakes to show old-fashioned machinery, or demonstrate principles of physics and chemistry, the machines and models will actually *work*: you push a button and they do their stuff.

Everybody's Desire

It has remained for the newest of America's great museums, the Museum of Science and Industry in Chicago, to capture a specimen of a whole major industry and install it within its walls, keeping it alive and working. For this museum has caged for your interest and better understanding a full-sized coal mine, an exact duplicate of one of the great mines of the famous southern Illinois bituminous coal district. All the modern labor-saving machinery and life-saving safety devices are there for you to see, and real miners in their working clothes are there to work them for you. A trip through this coal mine in a museum will help you greatly to understand how the commonest of our fuels is wrenched from its age-long repose in the depths of the earth and brought to the surface for our use.

The choice of the Museum of Science and Industry is a happy one. Of all the kinds of industrial plants there are, they could hardly have selected one more popular. Everybody has wanted, at some time or other, to go down into a coal mine. But the wish is not easily granted. Coal mines are busy places, and visitors are quite frankly in the way. Besides, actual coal mines are usually wet and slippery, with uncomfortably low spots in the roof where you can't find a spot to stand upright. Added to this, there are the dozen dangers that always hang at the heels of miners—explosions, rock falls, machinery gone wrong—which are bad enough for the working force to contend with, but would be much worse if one of them happened to

trap a visitor. So as a rule we never get to see a coal mine.

It is this that makes the Museum's choice such a fortunate one; we can satisfy a life-long curiosity without bothering busy men and without inconveniencing ourselves. The Museum intends to install other full-sized samples of industrial plants later, as its expanding floor space permits. But it is a good thing that the mine came first.

As you enter the Museum, the coal mine is the first thing you see: it ends the vista down the main axis of the building. It towers aloft under the high roof just as its prototype does under the higher dome of the southern Illinois sky. This tower that is the center of the above-ground works of any typical coal mine is really the head of a great elevator shaft; in mining parlance it is called the "tibble." At one side is the engine-house where the hoisting machinery is sheltered; you can see the cables running aslant to the head of the tibble, where they lie in the grooves of great pulley-wheels that direct their vital work of lifting the loads of coal all day long, and of the men who mine it when they come up at night for supper and bed.

To go down into a mine you have to begin by climbing a short flight of stairs. This brings you to a door, which opens into a cage, not unlike that of an elevator in an office building—except perhaps that it is not quite so "fancy." At a signal, the operator shoots the cage downward. Down, down, down you go, hundreds and hundreds of feet. In an actual coal mine you might descend half a mile or some such matter.

A Stage-Curtain Trick

In this coal mine in a museum, of course, it is not necessary to make so great a descent. And in this particular location, as a matter of fact, a deep shaft would hardly be possible. For the Museum of Sciences and Industry stands on sandy land near the shore of Lake Michigan, and a deep shaft would be merely a deep well—they would have to be pumping against the Great Lakes to keep it dry. So they compromise by treating you to most realistic illusion. The cage drops more slowly than it seems to be going, and at the same time the apparently solid walls are pulled rapidly upward past your eyes, running over rollers like stage curtains. So real is the

illusion that many visitors insist that they are hundreds of feet under ground when they step out of the cage.

At the foot of the shaft you find yourself in the very heart of the mine, the center of its whole circulatory system. Here the coal is brought in trains of small cars hauled by an electric locomotive—for the old-fashioned mine mule, that cave-dwelling animal that never saw the sun, is long since departed from modern mines. Such a train has just come in as you leave the cage.

As you watch, one of its cars slides forward onto a section of track over-arched at either end by a high circle of steel. A man sitting by a machine with a dial presses a button. Instantly the track section, car and all do a side roll before your eyes, turning the car completely upside down. The coal spills out into a pit, invisible below, with a terrific crash, and you begin to realize what a noisy business coal mining is. The pointer of the dial leaps halfway round its face, a bell goes "ding!" and you see a sheet of paper slide along with a newly-printed purple-ink "4000 pounds" on its face. The whole proceeding has been an automatic weighing of some miner's two-ton loading.

More Water Than Coal

The coal, your guide explains to you, has fallen into the weighing-pan of the scales, recorded its weight, and then been dumped out again into a container at the bottom of the shaft, called a "skip." (If you remember your Icelandic, you will recall that is the ancient Norse word for "ship," and wonder if it has anything to do with the case.) The skip, when full, takes a ride to the top of the tippie, where it is either dumped directly into a waiting coal car or truck, or, if it is to be sold as some grade other than "mine run" coal, it is delivered over to the various screens and washing machinery that elevate it to its proper place in the aristocracy of carbon.

Your guide now calls your attention to a couple of pumps that are greedily sucking away at a pool of black water in a pit which he calls a "sump." This is the lowest part of the mine, into which all the water eventually drains. Almost all coal mines are wet, and if the pumps do not keep laboring day and night the mine will be filled with water and ruined. Pumpmen therefore are among the veritable high priests of mine mechanics. In even the bitterest labor wars they stick to their posts without reproach from their striking comrades,



CLEAR TRACK FOR VISITORS' SPECIAL

—in the heart of the coal mine of Chicago's Museum of Science and Industry. Visitors in the mine car are waiting for their engineer to phone ahead that the train is coming. The walls of real coal and the ceiling of limestone were moved from a mine of the famous Southern Illinois field.

for they must save the jobs for the miners, as well as the mine for the "boss." The importance of the pumps is better realized when your guide tells you that in some mines more water than coal is lifted to the surface.

But a train of two caged-in cars, holding a party of about thirty persons, is waiting, and your guide sees you all seated. In such cars miners go to work in the morning and come back at night, for in a really big coal mine like this one there are underground streets as extensive as those of a good-sized town. The ride lasts for many minutes, passing openings into side-passages where you can see miners hard at work. Here again the apparent distance covered is increased by a clever illusion trick.

There is, however, no illusion about the coal you see on the walls, either at the foot of the shaft or any other point where you stop to see how the machinery works. It is all real coal, brought from the high-grade bituminous field in the southern part of the state, and built into the walls.

As you ride along, safety doors open before you and close after you have passed. But at last you come to a wider space—a "room" as the miners call it, where one of the tremendous machines that has so largely replaced human muscle-and-pick work has been gnawing into the coal.

It is a squat, massively built steel monster, and projecting from its forward end is a weapon that looks like a

sawfish's saw, multiplied by ten. The tough steel teeth that edge it, however, are mounted on an endless chain, so that when this terrific implement is shoved against the face of the coal wall they gnaw right through it, cutting a deep gash. This blade can be turned in any direction. Its usual method of working is to make a horizontal cut under the coal at the bottom of the seam, and then one or more vertical cuts deep into the face of the coal.

This leaves the coal hanging to the roof, ready to be blasted down. Alongside the cutting machine is a coal drill, ready to bore a deep hole into which the dynamite cartridge can be inserted. For safety's sake, Illinois law requires all "shots" to be fired at night, when the miners are out of the mine. Then in the morning they can pick up the pieces and load them into the cars.

Much of the picking up is done by another massive machine, whose greedy steel jaws, sweeping endlessly and fast, remind one of an enormous beetle as strongly as the cutter did of a sawfish. This loads the cars faster than a dozen strong-backed miners could ever hope to, and then they are pulled away by the electric locomotive, ready for their ride up to the sunlight which first made the plants that made the coal so many, many millions of years ago.

Beyond all question a trip through the coal mine that has been caged in a museum belongs in every body's education.

Science News Letter, October 28, 1933

PALAEONTOLOGY

Prints of Earliest Feet Found On Slab of Rock

FOOTPRINTS left on a muddy shore by some of the first feet that ever walked the earth have been brought to Mount Union College, Alliance, Ohio, by Prof. George F. Lamb of the geology department. The soft mud on which the long-gone animal walked was buried and hardened into stone ages ago, and the five-foot slab recording their passage was found on a farm near Berlin Center, Ohio.

The animals were members of the primitive amphibian family called Stegocephalians, which came ashore and walked on legs some two hundred million years ago. The slab shows that the animal which made these tracks had four toes on each front foot and five on each hind foot. The line made by the dragging tail is also clearly defined.

Science News Letter, October 28, 1933

MEDICINE

Cancer Not Hopeless; Over 12,000 Survivors Reported

SUFFERERS from cancer have almost as much chance of being "cured" as persons suffering from any other disease. This is the opinion of experts attending the annual clinical congress of the American College of Surgeons.

The study of cancer has been one of the outstanding activities of the college, which is not a college at all but a great guild of 11,000 of the leading surgeons of the country. The College has collected records of over 12,000 cancer patients who have been "cured" and remained alive and well for over five years.

In spite of this record, the surgeons do not like to speak of cancer as a curable disease in the sense that every case can be cured.

"Cancer is an arrestable disease like tuberculosis, not a curable disease," asserted Dr. Charles A. Dukes of Oakland, Calif. For example, one patient, a 33-year-old woman, had a breast removed because of a large cancer. She lived a normal life for 21 years, raising her family to maturity. When she was past 60 years of age she died of cancer that had attacked every possible organ of her body. But meanwhile she had had 21 years of normal, active, useful life.

"There is nothing more to be ashamed of in having cancer than in having pneumonia or any other disease," Dr. Dukes declared in stressing the importance of early treatment for cancer. He described the case of a man who had for years lived in a hut along the San Francisco waterfront, shutting himself away like a hermit, because he was ashamed to have anyone know he had cancer. When he finally came to the physician, half his face had been destroyed by the cancer, though it was of a kind that yields readily to treatment in the early stages.

Science News Letter, October 28, 1933

PHYSICS

Yellow Sodium Vapor Light Reveals Colorless Details

FOR REVEALING the details of small colorless objects, the yellow single-color light from sodium vapor is definitely and significantly superior to the ordinary light from incandescent tungsten filament lamps such as are used in everyday lighting.

Drs. M. Luckiesh and Frank K. Moss of General Electric's Lighting Research Laboratory, Cleveland, have reported to the Optical Society of America an appraisal of the visual effectiveness of the new sodium vapor light, about to come into specialized commercial use, as compared with the familiar tungsten filament light.

The advantage of one illuminant over the other depends upon the purpose for which the light is used, the investigators concluded. In addition to revealing details better, the speed of retinal impression is also higher under sodium light for objects that occupy only a very small part of the field of vision.

On the average, the proportion of light reflected by a large variety of colored specimens is practically the same for both illuminants, although there is wide variation in individual colors. Sodium light enhances brightness-contrast between various pairs of colors in more cases than tungsten light does, but there are many exceptions.

The yellow sodium light often plays strange tricks upon eyes that are accustomed to white light, but measurements of nervous muscular tension as a result of reading gave in the reported experiments no indication of a difference in the behavior of the human seeing-machine under the two illuminants.

Science News Letter, October 28, 1933

IN SCIENCE

AERONAUTICS

Government Again Cuts Aeronautic Research

SCIENTIFIC research in aeronautics received a new blow in a further curtailment of funds for this work at the National Bureau of Standards.

At the beginning of the present fiscal year all research work conducted under funds of the Aeronautics Branch of the Department of Commerce was discontinued because of lack of funds. Later a part of this work was restored because it was hoped that the Budget Bureau would allow some additional funds for this urgent work. Fourteen of the 35 men who had been dismissed from this type of research were restored to carry on the development of radio aids to air navigation, such as the devices for blind flying and landing.

Now this staff has been again reduced to but four persons.

Science News Letter, October 28, 1933

CHEMISTRY

New Foundation Seeks Uses For Neglected Materials

RESearch into the possibilities of raw materials now either unused or put to inferior uses will be the main objective of a new organization, the Northwest Research Foundation, whose founding is announced in *Science*.

The Foundation consists of a group of business men of the Minneapolis-St. Paul territory, who will raise funds to be used by scientists at the University of Minnesota. They will investigate the possibilities of semi-wastes such as casein and low-grade grains, as well as unused natural resources like lignite, peat and aspen trees that grow on cut-over and burned-over lands.

When a profitable discovery is made and patented, the first returns from its exploitation go to reimbursement for the costs of the research project that brought it about, and any further profits are divided between the University of Minnesota and the financing of further researches.

Science News Letter, October 28, 1933

EN FIELDS

PUBLIC SAFETY

Delaware Makes Sleepy Drivers Take Naps

PULL OVER and take a nap. This is the order that Delaware State Police are giving to sleepy truck drivers that they catch on the Delaware roads.

An active campaign against the menace of over-fatigued drivers is the result of a recent crash between two trucks when one driver fell asleep. Three men were killed in the collision.

All truck drivers are required to carry tickets showing the time they left their starting point and when the last trip was finished. A driver must show this ticket at the weighing scales where police check up on the load a truck is carrying to see that it is not over-weight. No driver or helper may be "connected with a truck" for more than 16 hours out of 24, the regulations now provide.

Science News Letter, October 28, 1933

ENGINEERING

Underground Oil Processing May Salvage Old Wells

UNDERGROUND distillation and cracking of oil is to be attempted in the Baku oil fields to salvage the 50 to 90 per cent. of petroleum that remains in the ground after an oil gusher has stopped spouting, and after pumping brings forth no more oil.

The new scheme for a second exploitation of oil wells is the invention of a young Russian chemist, A. B. Scheinman, who is assistant to the internationally known inventor of the vapor-phase oil cracking process used in Russia, K. K. Dubrovai.

He tackled the problem from a novel angle. His idea was to increase the temperature within the oil wells to such a degree as to convert the crude oil into gas and vapor within the underground layers. This underground gasification, distillation, pyrolysis and cracking is done with inexpensive heat obtained by burning about four per cent. of the crude oil.

Large scale experiments were carried on at the State Research Petroleum In-

stitute in Moscow where a model of oil well geological formations was used. Impressed by these experiments, the commissariat of the heavy industries has made a financial grant that will allow field experiments in the Baku oil fields on a large scale.

Conventional methods of exploiting oil wells for a second time consist in injecting compressed air to increase pressure, or flooding an inactive gusher with water to lift the crude oil to a pumping level. It is claimed, however, that this second exploitation seldom yields over five per cent. crude oil and for this reason the cost is prohibitive.

Science News Letter, October 28, 1933

PUBLIC HEALTH

No Signs of Vitamin A Lack in Depression

DEPRESSION diets had no lack of vitamin A, whatever other important food substances they may have been deficient in. Evidence of this has just been obtained by a formal inquiry of leading eye specialists throughout the United States.

Results of the inquiry, reported by Drs. Alfred F. Hess and Daniel B. Kirby of New York City, in the *American Journal of Public Health*, show that there has been no increase in cases of night-blindness or xerophthalmia during the depression. Both these conditions result from lack of vitamin A in the diet, and eye specialists have been watching particularly for them in recent years. Both diseases are extremely rare in the United States.

Science News Letter, October 28, 1933

MEDICINE

Two Gases Protect Mother After Childbirth

TWO OF the most formidable complications of childbirth may be anticipated with less dread and fear if a new method of treating them lives up to its early promise, anesthetists meeting in Chicago were told by Dr. Roland L. McCormack of Louisville, Ky. He reported successful treatment of convulsions and of hemorrhage after childbirth by inhalations of a mixture of carbon dioxide and oxygen.

The same method was successful in resuscitation of infants suffocated at birth or whose breathing apparatus failed to function properly soon after they were born.

Science News Letter, October 28, 1933

ENGINEERING

Soviet Plans Train to Run On Giant Ball Bearings

A STREAMLINED electric train running on giant motorized ball bearings in a grooved concrete track will be built in the Soviet Union as the result of successful tests in which a working model of the train attained a speed of 70 kilometers an hour (43 miles per hour). The train is expected to make 300 kilometers an hour (185 miles per hour) according to its inventor, Engineer Yarmanchook.

The train, perfected after eight years' labor, is quiet while running at high speed.

Each car rides on two large balls whose outside edges have been flatted slightly in order to make them serve as wheels. A powerful motor turns the axle of each ball. The "wheels" run in a grooved concrete runway, and the cars have a low center of gravity.

When running slowly the train wobbles slightly from side to side, but at high speed it is extremely comfortable, steady and silent.

One of the construction problems to be faced is that of friction between the concrete runway and the balls. The model was run on a wooden runway.

Science News Letter, October 28, 1933

VETERINARY MEDICINE

Tongue Vaccination Protects Against Rabies

THE TONGUE is the best place to vaccinate animals against rabies, Drs. John Reichel and J. E. Schneider of the Mulford Biological Laboratories, Glenolden, Pa., have found. They reported to the American Public Health Association, results of their efforts to determine the best methods of protecting animals from this horrible disease.

The relative potency of various rabies vaccines and the length of time protection will last following a prescribed number of injections of vaccine were among the points determined in their investigations. Injection of the vaccine into the brain is nearly always fatal, regardless of the size of the dose used. Other methods, such as injections under the skin or into the veins or muscles, are uncertain and give inconsistent results. Injection into the tongue was finally settled on as most satisfactory.

Science News Letter, October 28, 1933

PUBLIC HEALTH

Depression Victims Have More Illness Than Chronically Poor

Survey Shows Sickness More Widespread Among Families Stricken Since 1929 Than in Always-Impoverished Classes

VICTIMS of the depression, families that have become impoverished since 1929, have had much more sickness than the "chronically poor" whose poverty dates back of 1929.

This is one of the findings of a survey, conducted jointly by the U. S. Public Health Service and the Milbank Memorial Fund, to determine the effect of the depression on health. A preliminary report of the survey was made by G. St. J. Perrott and Dr. Selwyn D. Collins of the U. S. Public Health Service to the American Public Health Association.

Cities and Villages

The survey was made in poor districts of Detroit, Cleveland, Pittsburgh, Syracuse, New York City, Brooklyn, Baltimore, Birmingham, coal mining camps near Morgantown, W. Va., and cotton mill villages near Greenville, S. C. Slum areas were not included. Information as to amount of illness and family incomes before and since 1929 was obtained from almost every family in the areas investigated.

A relatively large drop in economic status appears to be associated with a large incidence of illness, the investigators found. No conclusions as to the broad implication of the findings can be made yet, since the survey has been completed in only five of the cities: Birmingham, Pittsburgh, Detroit, Syracuse and Greenville, S. C. Thus far, the figures show that those who were in reasonably comfortable circumstances before 1929 but have since dropped to comparative poverty suffered 55 per cent. more illness than their more fortunate neighbors who were in the same economic status in 1929 but had had no drop by 1932.

Families of the unemployed had 46 per cent. more illness than families whose heads were full time wage earners; families having part time workers only had 28 per cent. more illness than families whose heads were full time wage earners. This was true in each city

as well as in the whole group.

The extra illness among the depression poor was not limited to children or very old people. The sick rate was higher at all ages among the unemployed than in families having full or part time workers.

Most of the extra illness was caused by the respiratory diseases such as coughs, colds, influenza and the like. The unemployed and their families suffered much more from these ailments than did their more fortunate neighbors, but they also had more of every other kind of sickness.

However, while the children of the unemployed had more colds, coughs and respiratory diseases than their neighbors, they did not have as much whooping cough, measles and other epidemic diseases of childhood as did the children in more comfortable economic circumstances. The reason for this has not yet been ascertained.

Science News Letter, October 28, 1933

MEDICINE

Oxygen Tube Replaces Tents and Rooms

DESIGNED to supplant oxygen tents and oxygen rooms in the treatment of patients suffering from oxygen lack, an oxygen tube has been developed at the State of Wisconsin General Hospital, Madison, by Dr. Ralph M. Waters and Dr. E. A. Rovenstine.

The advantages of the new apparatus over the old lies in economy and facility of handling, it is claimed. A small flexible tube is inserted into one nostril of a patient. The tube lies against the back wall of the throat. It is tipped near the opening of the windpipe, and is held in place by adhesive tape on the patient's lip.

The free end of the tube is attached to a humidifier and a meter, which are, in turn, attached to the tank of oxygen. The meter permits a careful regulation of the flow of oxygen, and the humidi-

fier adds the precise amount of moisture needed.

Thus the enriched atmosphere supply can be controlled entirely without depending upon the natural humidity of the air at any one time. Such an apparatus can be kept in readiness by even the smallest hospital, removing the necessity of having expensive oxygen rooms and oxygen tents. The actual cost of oxygen administered would be greatly decreased, making it more available to the poor class of patients, to whom it is now often denied.

The new method would also allow for proper nursing and feeding of the patients during the administration of the oxygen, a practice that is made difficult by the use of oxygen tents.

Science News Letter, October 28, 1933

METEOROLOGY

Weathermen Unwittingly Pose Hallowe'en Picture

See Front Cover

NOT ANCIENT warlocks making weather but modern scientists just making a record of it, unintentionally posed a good Hallowe'en picture on the top of Mount Washington, with the aid of a cat that doesn't like wind. The photograph has nothing of the mellowness of autumn about it—quite naturally, since it was taken during the winter, when Polar Year studies were being conducted on what is perhaps the windiest mountain-top in eastern North America. So violent are the gusts there at times that a witch could easily take a sky-ride on a broomstick without invoking any supernatural aid at all.

The cat, which injects such a decided Brocken-note into the scene, lacks one element necessary for the conventional witch-picture: a puffed-out tail. The Mt. Washington mascot is a Manx.

To our ancestors, even this would have strengthened the suggestion of the infernal, for in Shakespeare's England it was commonly believed that a witch could change herself into any animal she liked, but that the beast's tail would always be lacking. The first Witches' Scene in *Macbeth* contains such an allusion:

"But thither in a sieve I'll sail,
And like a rat without a tail
I'll do, and I'll do, and I'll do!"

The photograph was made by Winston H. Pote who has obtained a number of excellent pictures of the observatory activities. (See SNL, Aug. 12, 1933)

Science News Letter, October 28, 1933

ARCHAEOLOGY

Great Attack Planned on Tennessee Valley's Prehistory

Archaeologists Seek to Reconstruct Pre-Columbian Life Before Flooding Wipes Out Mound and Village Remains

ARCHAEOLOGISTS are expressing concern over an important job to be done in Tennessee before engineers begin rearranging the waters and the land according to the Tennessee Valley Authority plans.

The important job is to rescue remains of ancient Indian occupation in the area that will be flooded or torn up by excavations. Almost nothing is known about the kind of Indians who lived in the Valley region before Columbus. If American archaeologists do not work quickly, the evidence of what happened there in prehistoric times will be wiped out beyond all power of science to reconstruct it.

Six-Month Survey

Efforts are being made by several scientific organizations to finance the rescue of this threatened historic material. The plan is to send a competent archaeologist to the region to spend about six months finding out what he can about the earliest inhabitants of the Tennessee Valley.

The land to be covered by water when Cove Creek Dam is constructed, one of the first projects anticipated, will be surveyed by this archaeologist for traces of mounds, villages, and burying grounds. Road building and grading work have already been started, and the archaeologist will make a point of examining anything that the steam shovels turn up that seems significant in Tennessee's ancient history.

Most of the archaeological digging in this region was done some years ago, when there was more interest in gathering collections of arrowheads and pottery than in learning who the ancient inhabitants were and all about them.

The mysterious Yuchi Indians, who are little more than a myth and a name, may come to light as real people in the Tennessee Valley.

"Early narratives mention the Yuchi as living in this part of the country and credit them with being a people of superior intelligence," says Neil M. Judd,

curator of archaeology at the U. S. National Museum. "But no Yuchi site, where the people had their homes or graveyards, has ever been explored archaeologically. We know that there was a Yuchi village site at Wilson Dam above Muscle Shoals, but when the dam was constructed the site was flooded and whatever material the ground contained is gone."

Related to Mound Builders

The Yuchi may have been related to mound building Indians in their manner of living, Mr. Judd explains.

Traces of other Indian comings and goings may be hidden in the Valley soil. The Cherokee are known to have pushed down into southeastern Tennessee, but presumably in rather recent times, says Mr. Judd. In the northern part of Tennessee there were Chickasaw Indians. And it is known that Siouan peoples spread in that direction from southern Ohio. The ground that is to be dissected for roads or buried under tons of water may contain evidence that the expert can read into a

coherent story of Indian wars and wanderings and tribal friendships.

There is even possibility of finding older traces of habitation. Limestone caves in Tennessee may have been taken for shelters by wandering hunters who seem to have preceded the various forms of culture that are known as Indian. These ancestral, more primitive people are known today only through their stone dart points found with remains of animals long extinct.

Science News Letter, October 28, 1933

ARCHAEOLOGY

Comical Glass Cow Held Perfume For Romans

IT TOOK a poet-humorist to point out to the modern world how delightfully ridiculous a purple cow would be. Now it appears that an artist-humorist of ancient Rome had a similar bright thought about purple cows. Only, instead of writing a verse, he made a glass cow tinged with purple. The comical cow has come to the Metropolitan Museum of Art, among recent gifts. The cow served as a bottle, the exaggerated lips forming a mouth for pouring perfume or other liquid. The bottle stands a little over four inches high.

That the Roman cow was really purple from the start, and not merely tinged by age, is indicated by experiments. The Museum chemist attributes the purplish streakings to particles of pyrolusite mixed in the glass. Some of these particles may still be seen as black



PURPLE COW, ANCIENT ROMAN MODEL

spots. A sample artificially made in the laboratory by adding some pyrolusite to molten glass gave this same purplish streaked effect.

Science News Letter, October 28, 1933

ASTRONOMY

New Comet Discovered By Harvard Astronomer

A NEW COMET discovered by Dr. Fred L. Whipple of the Harvard College Observatory, is at present in the constellation Taurus, the Bull, a little south of the familiar compact group of stars, the Pleiades. These two constellations may be seen low in the east at about nine in the evening. The new comet is moving slowly in a southwesterly direction.

Whipple comet has been spotted on a photograph taken with the 16-inch Metcalf telescope at the Oak Ridge, Mass., station of the Harvard Observatory on Oct. 15 and also on several plates taken Oct. 20. Prof. George Van Biesbroeck of Yerkes Observatory confirmed the discovery.

Science News Letter, October 28, 1933

ENDOCRINOLOGY

"Instinctive" Behavior Provoked by Human Extract

NEST-MAKING by female rabbits, long regarded as a typical example of purely "instinctive" activity, has been artificially provoked by injecting a commercial drug containing an active principle from the glands of pregnant women. Results of experiments producing this result are reported by Esther Bogen Tietz of Longview Hospital, Cincinnati, in *Science*.

A female rabbit always makes a nest out of her own fur just before her young are born. She plucks this fur from the lower side of her body, and cards and fluffs it with her claws. When the young are born, she covers them up with this loose fur, most carefully, presumably to keep them warm and to keep their tiny wet bodies from drying off too rapidly.

The whole thing is a procedure quite alien to anything a human mother does, yet the gland extract from expectant human mothers has sufficed to provoke this typically maternal reaction in non-pregnant rabbit does.

Science News Letter, October 28, 1933

ECONOMICS

Machine Age Benefits Upheld; Better Distribution Demanded

THE MACHINE to some in this modern world has become symbolic of the unhappy economic conditions in which the world finds itself. In some quarters there is a sincere, if mistaken, cry for the return to manpower and handicraft.

"To abandon the machine is unthinkable." This conclusion of an editorial in the *Engineering and Mining Journal* expresses the more informed opinion of today. Says the editorial:

"When, less than two years ago, technocracy and those who preached it had the world by the ears, and when, somewhat later, the idea seemed to have been dismissed in disgrace and ridicule from the public mind, few suspected that before twelve months had passed one of the leading industrial nations of the earth would be deliberately attempting to modify the structure of its economic and social system so that unemployment might be abolished the while that the benefits of mechanized industry were retained. The prophet-technocrats were indeed extravagant in their assertions; doubtless they greatly underestimated the time element involved in the changes of which they spoke, but there was a vital truth in their recognition of the fact that only disaster lay in refusing to note the inevitable effect of the machine upon society and to plan the needful readjustment. For it is society that must change and not that the machine must be abolished. As sane for Athens to have killed its slaves, thereby making impossible at that time the lofty achievement of the Periclean age, as for the United States or any other nation to abandon the machine and revert to hand labor. It is the machine that will ultimately make men free from drudgery and give them time to think. And when that day at last arrives it will be the dawning of a greater age than that of Pericles.

"The apparent dilemma in arguing that invention must not be retarded at the same time that one urges that employment must be increased is no dilemma. The two theses are not at all opposed, and this becomes apparent when at last one recognizes that the social structure and the habits of in-

dustry can and will be changed if a sufficient number of the people rouse themselves to demand it.

"To abandon the machine is unthinkable. Who that has become well accustomed to the typewriter will return to longhand? In considering this simple, personal operation the folly of the suggestion becomes apparent. It can be made equally plain, no matter what more complicated application of the machine is selected for analysis. And it is less foolish only in degree to advocate the partial scrapping of equipment and the throttling of invention. The machine is a boon, mankind's servant. But mankind must see to it that the production and benefits of the machine are properly distributed."

Science News Letter, October 28, 1933

ZOOLOGY

Buffalo Meat Again To Cheer Indians

SURPLUS buffalo from Yellowstone Park again will be distributed to nearby Indian reservations, according to Supt. Roger W. Toll. The purpose is twofold—to augment the Indians' food supply, and to bring back to them a bit of the glamour of the past when buffalo roamed the range in almost countless numbers and they ate bison meat every day.

Authority for the disposition of surplus buffalo from the Yellowstone was granted by Congress when it was found that these animals, at one time almost extinct, were increasing at such a rate that it was necessary to determine the maximum number the park range would support and keep the herd down to that number. For the past decade at least the effort has been to keep the buffalo to a maximum of 1,000 head.

This year, owing to poor range conditions, the short hay crop at the buffalo range, and a shortage of funds with which to furnish enough additional hay to feed 1,000 of these great animals, it has been decided to reduce the herd to 900.

Between 200 and 235 buffalo will be available for disposal.

Science News Letter, October 28, 1933

GEOLOGY

Unknown Interior of Earth Invites Future Explorers

COLUMBUSES and Byrds of the future will have to seek their exploration territories within the earth, now that the surface has all been scanned and traced on maps. For though Africa is no longer an unknown continent and the poles no longer inaccessible, the earth a few miles under our own feet is still as secret as was the Western Hemisphere before Columbus.

The possibilities of earth-interior exploration and some of the means for its achievement were discussed by Prof. W. T. Thom, Jr., of Princeton University in an address given in New York City under the auspices of Science Service.

An oil well two miles deep is the longest probe man has ever made into the earth's crust, Prof. Thom said. A gold mine a mile deep is the farthest man has ever penetrated in person. But these are mere pin-pricks when compared with the four thousand miles that lie between earth's surface and its center.

It will not be necessary to pierce a fabulous tunnel through the earth to learn about its interior. Much knowledge can be gained by less direct methods, just as a doctor can use X-rays to learn about his patient's insides without having to cut him open.

Airplane a Tool

One of the possible aids for explorations of the interior is the airplane. The apparent paradox in this suggestion disappears when air photographs taken at great heights are examined, for they disclose interrelations between widely separated geological structures that are not at all evident to a geologist on the ground.

Other tools for earth-exploration can be borrowed from the oil prospector and the military engineer. They consist of delicate gravity balances, which disclose massive rock formations buried under less dense deposits, and devices for "listening in" on explosion-waves started through the earth by setting off large charges of TNT, which by their speeds of travel tell the character of the strata through which they pass or off which they are reflected.

In several parts of the earth, studies of entire mountain systems as geological unities are beginning to yield information about the nature of their rock layers where they are buried deep beneath adjacent plains. Similar studies are being made of mountain ranges sunk deep beneath the sea, and their relations to the structure and movements of the nearest land masses.

Dr. Thom's address was sent out over the network of the Columbia Broadcasting System.

Science News Letter, October 28, 1933

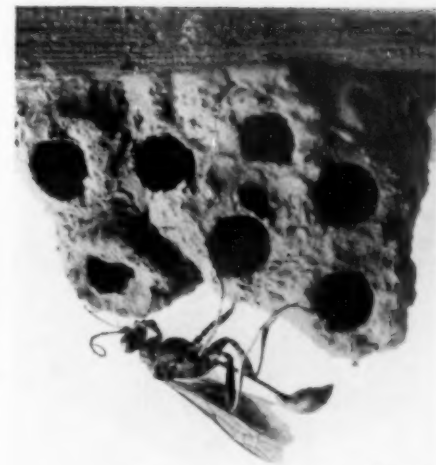
REFRIGERATION

Dry Ice Strengthens Ice Box Against Electric Refrigerator

THE ELECTRIC refrigerator, which has taken the place of natural or water ice refrigerators in millions of American homes, may yet have a fight on its hands to hold the ground that it has gained so rapidly. The rumor that the old icebox may come back into its own, but with modern "dry ice" or solid carbon dioxide as the refrigerant, has aroused the interest of engineers and housewives alike.

Dry ice is a solidified gas, frozen carbon dioxide. Its melting point is 57 degrees Centigrade below that of ice. The uninitiated might say, "Fine, that will make it all the better for home use," but such is not the case. A refrigerator may easily be too cold. Foods are best preserved at temperatures a little above the freezing point of water. A "dry ice" refrigerator without some radical changes from the ordinary ice box would do its job too excessively well.

But granting that this difficulty can be overcome—and it does not appear too difficult for engineers to solve—what are the advantages of using solid CO₂? The fact that one pound of it is equivalent to nearly two pounds of water ice would mean a smaller storage chamber for the refrigerant. Its popular trade name suggests another important advantage: it is dry. The new ice



(Cornelia Clarke Photo.)

HOUSE FOR INFANTS ONLY

does not pass into a liquid but into a gas which is claimed to have preservative properties. The smaller quantities of ice can be handled easier because they are dry.

Science News Letter, October 28, 1933

ENTOMOLOGY

Mud-Dauber Wasp Pioneer Among Masons

MANY thousands of centuries before the first mud huts rose on the Mesopotamian plain or the banks of the Nile, before the first adobe houses were built in Mexico, mud-dauber wasps developed their art of building upside-down pueblos in sheltered corners and crannies.

The mud-dauber's nest is not an analogue of the human house, nor even of the communal dwelling built by her kin-insects the paper-wasps or hornets, for she never lives in it. She merely deposits an egg in each cell, stores a provision of sting-stunned insect or arachnid victims, and seals up the entrance. Next spring the coming generation of mud-daubers will emerge, ready to take up the family tradition of skilled workmanship in clay.

Science News Letter, October 28, 1933

NATURE RAMBLINGS by Frank Thone

EVOLUTION



Irreversible Evolution

BIG THINGS can evolve out of little ones, but not little things out of big ones.

The whole course of evolutionary history is littered with examples of developmental lines of animals and plants that started small, grew big, then huge, and then—died. Faced with changed and adverse conditions, they apparently could not contract the scale of their operations to weather the storm. They could only go into involuntary bankruptcy and pass out of the picture.

It was so with the dinosaurs. The earliest reptiles, in the age that succeeded the lush days of the coal era, were moderate-sized beasts. The biggest of them did not outrank modern crocodiles or the giant tortoises of the Galapagos. In succeeding geologic periods, one reptilian line, the dinosaurs, began to take on size: first as big as a horse, finally as big as a house. Then came one of the world's periods of major geologic change—a revolution—and down went the dinosaurs. The reptiles who survived and now possess

their modest share of the earth were the less ambitious, less grandiose orders—lizards, tortoises and turtles, crocodilians, and the later-appearing snakes.

The same is true of the giant plants that lived in the coal age. They were, some of them, relatives of the common horsetail rushes that now grow along railway embankments and in moist sandy soil. They aspired to great heights, developed into things as big as the giant cacti of our Southwest. But when geologic hard times came they couldn't "take it," and so passed out, leaving their share of the picture to their poor relations, the smaller horsetails, that somehow managed to struggle through not only those hard times but all that followed, and are still with us.

The same story could be told about a dozen families of mammals, that ap-

peared on the scene much later. Elephants will do as a type example. The earliest ancestral elephants we know anything about were animals not much bigger than a pig, without the great trunk and tusk development that came later. They grew and grew in succeeding geologic periods, until just prior to and during the last great glacial epoch they reached their climax in beasts more than a dozen feet high at the shoulders, with tremendous curved tusks. But they all went, with the exception of the two surviving species in Asia and Africa. And these, even without the deadly interference of man, must surely have followed their forefathers before many more thousands of years.

The meek always inherit the earth—and when they cease to be meek they presently lose it again.

Science News Letter, October 28, 1933

ARCHAEOLOGY

Cannibalism Everyday Habit Of Ancient Wisconsin Indians

"A BUNDANT evidence" that prehistoric Indians who lived at Aztalan, Wisconsin, ate human flesh as a regular article of diet—when they could get it—is reported by Dr. S. A. Barrett of the Milwaukee Public Museum.

In a comprehensive report on the site which has interested archaeologists for many years, Dr. Barrett declares that human bones found in refuse heaps at Aztalan are almost unbelievably numerous. The usual explanation that aborigines who practiced cannibalism did so as a special rite, and thus ate a bit of heart, brain or flesh of the enemy to acquire power, cannot be accepted here, Dr. Barrett says. The human bones are too numerous. They are almost all broken open for the marrow inside. The skulls have been opened for the brains. The remnants are tossed aside.

"Revolutionary as this idea may seem," says the report, "we are forced to suggest that the evidence points to the probability that human flesh was here used as a regular article of diet whenever it was obtainable and that the human flesh was handled in every way precisely as was that of the larger animals of the chase. Marrow and brains were considered as delicacies, whether they were the marrow and brains of the deer, bear, and buffalo or whether they

were those of a slain enemy or of a captive."

The Indian village which held this strange eating custom was built in an unusual manner. Excavations by the Museum show that it was a large village protected by no less than three stockades. A wall of posts twelve feet high surrounded the settlement. There were watch-towers at regular intervals, and the gates were so placed that they could be easily guarded. The actual fortifications have long since vanished, but fragments of post have been found and lines of the post holes can be traced. An earthen embankment added to the strength of the outer stockade.

From the earthworks at the site and other clues, it is believed that the village was most nearly like the culture of the mound building Indians to the south, at Cahokia in Illinois.

The theory once advanced, that Aztalan was the place in the north whence the Aztecs migrated to Mexico, is not upheld by evidence that can be found there, Dr. Barrett reports. The traditional first home of the Aztecs was called Aztalan, and the Wisconsin site was merely given this name when an early explorer examined it and thought it might explain the Aztec migration story.

Science News Letter, October 28, 1933

FRANK M. CHAPMAN

Curator of Birds at the
American Museum of Natural
History writes his life story

AUTOBIOGRAPHY of a BIRD-LOVER

Nature lovers and scientists will revel in Dr. Chapman's story of his long and active career spent in acquiring and disseminating knowledge about birds, their habits, habitat, evolution and their importance in the spiritual life of man. His work at the Museum, his travels over the world and his adventures afield are described in detail. Illustrated, \$3.75.

D. APPLETON-CENTURY COMPANY
35 West 32nd Street New York

• First Glances at New Books

Additional Reviews
On Page 288

General Science

100,000 WHYS—M. Ilin—*Lippincott*, 138 p., \$1.50. With this intriguing title, M. Ilin starts his readers on a trip around an ordinary room, telling them why the matches light, why the bread has a crust, why we wash with water, and so on. This Russian engineer-author writes books on science and history not only for Russian children but for factory workers and peasants and he does his explaining in so entertaining a manner that translating his books into English is becoming a regular custom. The drawings are by N. Lapshin, the original Russian illustrator of the book, and the translation is by Beatrice Kinkead.

Science News Letter, October 28, 1933

Geology

SYLLABUS AND LABORATORY MANUAL FOR GEOLOGY—Herbert P. Woodward—*Edwards Brothers, Inc., Ann Arbor*, 46 p., 14 pl., \$1.

Science News Letter, October 28, 1933

Child Training

SEX IN CHILDHOOD—Ernest R. Groves and Gladys Hoagland Groves—*Macanlay*, 247 p., \$3. Advice and information for parents of normal children.

Science News Letter, October 28, 1933

Psychology-Education

CHILD UPBRINGING AND THE NEW PSYCHOLOGY—Richard Amaral Howden—*Oxford Univ. Press*, 105 p., \$1. A pocket-size volume of advice for parents and teachers by a British author. It is written to inform and aid those who have been brought up on the truisms, "Spare the rod and spoil the child," "Children should be seen and not heard," and "The Battle of Waterloo was won upon the playing-fields of Eton."

Science News Letter, October 28, 1933

Education

MOLDERS OF THE AMERICAN MIND—Norman Woelfel—*Columbia Univ. Press*, 304 p., \$3. A critical review of the social attitudes of seventeen leaders in American education as judged by their writings and theorizings on education.

Science News Letter, October 28, 1933

Child Welfare

WHEN CHILDREN ARE INJURED IN INDUSTRY—Charles E. Gibbons, Chester T. Stansbury and Gertrude Folks Zimand—*National Child Labor Committee*, 43 p., 50c. Mrs. Zimand has prepared

this report of the investigations made by Mr. Gibbons and Mr. Stansbury of how children injured in industry have fared since their injury. The investigation so far covers only three states, Illinois, Wisconsin and Tennessee. Persons interested in either child welfare or industrial compensation problems will doubtless find the report valuable.

Science News Letter, October 28, 1933

Archaeology-Education

THE ORIENTAL INSTITUTE—James Henry Breasted—*Univ. of Chicago Press*, 455 p., \$3. In addition to being one of the twelve volumes of the University of Chicago Survey, this heavily illustrated volume is an admirable summary of the extensive work of the great research organization that has discovered so much about the past of man. It is therefore valuable for reading and reference by those who wish to participate intellectually in the Institute's successful endeavor to recover the lost story of the rise of man.

Science News Letter, October 28, 1933

Medicine

TEXTBOOK OF PHYSICAL THERAPY—Heinrich F. Wolf—*Appleton*, 409 p., \$5.50. Dr. Lewellys F. Barker has written the foreword and Drs. William Bierman, Adolph A. Lilien, Farel Jouard and Madge C. L. McGuinness have also contributed chapters. The growing use of physical therapy for treating diseases will make this authoritative book on the subject welcome to both general medical practitioner and specialist for whom it was written. Too technical for the layman, of course.

Science News Letter, October 28, 1933

Standards

A. S. T. M. STANDARDS OF TEXTILE MATERIALS—*American Society for Testing Materials*, 164 p., \$1.

Science News Letter, October 28, 1933

Zoology

THE LIFE HISTORIES AND ECOLOGY OF JACK RABBITS, *Lepus Alleni* and *Lepus Californicus SSP.*, IN RELATION TO GRAZING IN ARIZONA—C. T. Vorhies and W. P. Taylor—*Univ. of Arizona*, 118 p. Jackrabbits are not merely picturesque elements in the Western landscape, they are sometimes serious nuisances in that they get more than their share of the range grass. This bulletin discusses this economic aspect of their lives, along with general jackrabbit biology.

Science News Letter, October 28, 1933

Ethnology-Invention

MAN'S LONG CLIMB—Marion Florence Lansing—*Little, Brown* 154 p., \$1.75. Stories for children, about primitive and ancient men, women, and children and how they happened to learn to plant seed, to make wheels, to play music, and to do other things that improved their living. Conservative scientists might feel that some of the material has been over-simplified, since the origin of some of these advances is lost in prehistory and there is much difference of opinion as to how these things came about. However, the stories are nicely written. There are attractive illustrations by Ferdinand H. Horvath.

Science News Letter, October 28, 1933

Anthropology

THE AMERICAN ABORIGINES—Ten authors—*Univ. of Toronto Press*, 396 p., \$2.50. A feature of the Fifth Pacific Congress, this year, was the publication of this notable volume on major problems regarding America's aboriginal life. Naming a few of the papers included: N. C. Nelson discusses the antiquity of man in America in the light of archaeology. Erland Nordenskiöld writes on origin of Indian civilizations in South America, and H. J. Spinden takes the same subject with regard to Central America and Mexico. Diamond Jenness, editor of the volume, writes on the Eskimo, and W. A. Johnston on quaternary geology in relation to man's migration in North America.

Science News Letter, October 28, 1933

Medicine

LEADERSHIP IN MEDICINE—Lord Moynihan—*Oxford Univ. Press*, 48 p., \$1. An inspiring lecture delivered before the University of St. Andrews as fourth of the Walker Trust lectures on leadership; of interest chiefly to medical students and teachers.

Science News Letter, October 28, 1933

General Science

POPULAR SCIENCE TALKS—Edited by Ivor Griffith—*American Journal of Pharmacy*, 307 p., \$1.

Science News Letter, October 28, 1933

Economics

FEDERAL AND STATE LEGISLATION FOR UNEMPLOYMENT RELIEF AND NATIONAL RECOVERY, 1933—Marietta Stevenson and Lucy W. Brown—*Public Administration Service*, 19 p., 25c.

Science News Letter, October 28, 1933

● First Glances at New Books

Additional Reviews
On Page 287

General Science

THE ADVANCEMENT OF SCIENCE: 1933—*British Association for the Advancement of Science*, 264 p., 3s 6d. The practice of the British Association in bringing together each year the addresses delivered at its annual meeting provides a summary of science that is worthy of reading and preserving. The leading address in the volume is that on "Some Chemical Aspects of Life" by Sir Frederick Gowland Hopkins, president of the Association, and the American continent is represented by a botany section presidential address delivered by Prof. F. E. Lloyd of the University of Toronto.

Science News Letter, October 28, 1933

Geology

CAVERNS OF VIRGINIA—William M. McGill—*State Commission on Conservation and Development*, Richmond, 187 p., 48 pl., 23 fig., 4 tables, \$1, +25c. postage and handling charges. (Limited distribution). In Virginia's mountain-backbone there are many limestone caverns, some of them made safe for tourist crowds, others still reserved for the more agile and adventurous. Superb photographs and descriptions, chiefly of the developed caverns, are collected into this beautifully gotten-up book.

Science News Letter, October 28, 1933

Education

A WORK BOOK IN EDUCATIONAL PSYCHOLOGY—Harvey C. Lehman and Stuart M. Stoke—*Prentice-Hall*, 152 p., 80c. Each detachable page contains a problem, a list of questions, space for notes, and pertinent references. Intended to "give point and significance to the more formal textbook work."

Science News Letter, October 28, 1933

Sociology

BACCHUS BEHAVE!—Alma Whitaker—*Stokes*, 140 p., \$1.25. Hardly science in the sober sense of the word. Nor is it a treatise upon mythology of a past era. Sub-titled "the lost art of polite drinking" it may be that some scientists will, not many months hence, be interested in the idea, if not the book.

Science News Letter, October 28, 1933

Language

BASIC GERMAN FOR SCIENCE STUDENTS—M. L. Barker—*Heffer*, 164 p., 6s. While it is by all means desirable for every educated person to have a

literary as well as a utilitarian knowledge of the foreign languages he learns, the German imparted in conventional university courses leaves the graduate student lacking in certain essentials, notably in vocabulary, when he tries to apply the literary language to his special needs. For this reason textbooks like Dr. Barker's are highly valuable for the hopeful Ph.D. candidate.

Science News Letter, October 28, 1933

Zoology

NORTHWEST NATURE TRAILS—Herbert Sheldon Lampman—*Metropolitan Press, Portland, Ore.*, 289 p., \$3. A book of the beasts, birds, fishes and creeping things of Oregon and Washington, written in informal, discursive, frequently anecdotal style, but crammed with information and excellently illustrated.

Science News Letter, October 28, 1933

Archaeology

ANCIENT AZTALAN—S. R. Barrett—*Milwaukee Public Museum*, 602 p., 100 pl., \$7. It is doubtful that the Indian town known as Aztalan in Wisconsin has any connection with the Aztalan which tradition calls the ancestral home of the Mexican Aztecs. The idea is attractive but probably fanciful. Dr. Barrett tells us. Aztalan is important and interesting in its own right, as a town of the mound building Indians extraordinarily fortified by palisades twelve feet high with watch towers and entrance only by special gates. The Indian culture is pronounced an extension of the type found in the middle Mississippi region, as at Cahokia. The work of the Milwaukee Museum has preserved and discovered much valuable information about this remarkable old site, and this report brings together known facts, past and present.

Science News Letter, October 28, 1933

Radio

REPORT OF RADIO RESEARCH IN JAPAN—Radio Research Committee—*National Research Council of Japan*, 98 p.

Science News Letter, October 28, 1933

Physics

SMITHSONIAN PHYSICAL TABLES—Frederick E. Fowle—*Smithsonian Institution*, 622 p., \$3. The revision of the Smithsonian Physical Tables constitutes a scientific occasion. There are 871 tables in this eighth revised edition covering a very wide range as may be realized from the following sections: mathematical tables, physical constants, mechanical properties, densities, barometric tables, acoustics, aerodynamics, viscosity, vapor pressure, thermometry, melting and boiling points, thermal conductivities, expansion coefficients, specific heats, latent heats, heats of combustion, formation, etc., radiation, cooling by radiation, conduction, and convection, the eye and radiation, photometric tables, photographic data, spectrum wave lengths, indices of refraction, reflecting powers, transmissive powers, electro-motive forces, electrical resistance, wire tables, electrolysis, dielectric strength, dielectric constants, wireless telegraphy, magnetic properties, magneto-optic rotation, various magnetic effects, atomic data, atomic structure, atomic spectrum series relations and notations, radioactivity, X-rays, electron emission, meteorology, geodesy, geophysics, terrestrial magnetism, atmospheric electricity, astronomy, stellar motions, binary stars, variable stars, star clusters, nebulae.

Science News Letter, October 28, 1933

Religion—Philosophy

DOES SCIENCE LEAVE ROOM FOR GOD?—R. O. P. Taylor—*Cokesbury*, 246 p., \$1.25. The answer of the author, who is Vicar of Ringwood, Hants, is "yes." This is a book devoted primarily to religion.

Science News Letter, October 28, 1933

Psychology

HYPNOSIS AND SUGGESTIBILITY: AN EXPERIMENTAL APPROACH—Clark L. Hull—*Appleton-Century*, 416 p., \$3.75. A technical work formulating a scientific account of the major phenomena of hypnosis and suggestibility. Illustrated with many plates and diagrams.

Science News Letter, October 28, 1933

Science News Letter will secure for its subscribers any book or magazine in print which was published in the United States. Send check or money order to cover regular retail price (\$5 if price is unknown, change to be remitted) and we will pay postage in the U. S. When publications are free, send 10c for handling. Address Book Dept., Science News Letter, 21st and Constitution Ave., Washington, D. C.